

**CENTRAL MAINTENANCE  
(CM)**

**Scope of Work**  
**for**  
**Utilities Systems Repairs &  
Maintenance Services**

**Sewage Lift Stations & Wastewater Treatment Plant  
(NEWT) and Industrial Piping's ,Metals & Drainage System  
(Underground, Overheads, Elevated, Culvert, Metals Flat forms,  
Racks, Trays, Trenches, Culvert, Access Facilities, etc.)**

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## 1. INTRODUCTION

Ma'aden Aluminium (MA) is developing one of the largest integrated mining and Aluminium processing complexes in the world. The integrated Aluminum complex is located at Ras Al Khair consisting of Smelter, Rolling Mill and Refinery.

### 1.1 PURPOSE

This Scope of Work (SOW) document is an outline for engaging a Contractor to provide **General Repairs & Maintenance Services** for all of Ma'aden Aluminium Process and Non-Process Utility Facilities.

### 1.2 CODES, STANDARDS AND REGULATIONS

The Contractor shall perform the works in accordance with the applicable codes, standards and regulations prevailing in the Kingdom of Saudi Arabia. This standard includes the following as and when applicable as follows;

AS 1646 Elastomeric Seals for Waterworks Purposes / AS 1697 SAA Gas Pipeline Code AS 1768 Lightning Protection / AS 2032 Installation of UPVC Pipe Systems / AS 2033 Installation of Polyethylene Pipe Systems / AS 2187.2 Use of Explosives / AS 2430 Classification of Hazardous Areas / AS 2634 Chemical Plant Equipment made from Glass Fiber Reinforced Plastic(GRP) based on Thermosetting Resins / AS 2648.1 Underground Marking Tape -Non-detectable Tape / AS 2832.1 Cathodic Protection -Pipes, Cables and Ducts / AS 2885 Pipelines -Gas and Liquid Petroleum / AS 3000 SAA Wiring Rules / AS 3690 Installation of ABS Pipe Systems / AS 3894 Site Testing of Protective Coatings / B31.3 Chemical Plant and Petroleum Refinery Piping / B31.8 Gas Transmission, Distribution Piping Systems and Maintenance of Lifting Station in accordance with EN 12056.

### 1.3 LANGUAGE AND MEASUREMENT SYSTEM

All documents and communications shall be in the English language. All units shall comply with the International System of Units (SI Units).

### 1.4 CONTRACTOR'S PRE-QUALIFICATION REQUIREMENT

- 1.4.1 The Contractor shall have an established good management system & organization in conformity with applicable ISO Standards.
- 1.4.2 The Contractor shall have a wide experience in providing the same or similar services as mentioned in this scope of work with other reputable industries in the Saudi Arabia or within the Gulf Region re: ARAMCO, SABIC, etc..
- 1.4.3 The Contractor shall have its own integrated facility/workshop that has a wider scope of service capabilities and professional experience of the required field of services related to **Sewage Lifting Station & Wastewater Treatment Plant (NEWT) and Industrial Pipings, Metals & Drainage System**(Underground, Overheads, Elevate, Metals Flat forms, Racks, Trays,



Trenches, Access Facilities, Culvert etc.) **General Repairs & Maintenance Services** either in Dammam, Jubail and/or nearest to Ras Al-Khair area with a wider scope of service capabilities and professional experience of the required field of services.

## 2. SCOPE OF WORK

### GENERAL CONDITION:

The Contractor's task will be executed based on requirements initiated by the Central Maintenance Department (CM) planner and Maintenance Representative. A work order will be issued by Central Maintenance Department and based on this request; the contractor will submit a quotation to Central Maintenance Department representative for review and approval.

Once the quotation is approved, the contractor can start arranging the required materials, resources and a schedule will be made by the Central Maintenance Department planner and Contractor representative to complete the required task.

### THE TECHNICAL REQUIREMENTS:

The Contractor shall be fully responsible for the complete Maintenance Services for all Utility Process Facilities within Maaden Aluminum.

The Contractor shall perform the Works in accordance with the Standard and the latest issue of referenced standards. Should there be a conflict between the Works, Statutory Authority requirements and the Standards; the Contractor shall notify the Ma'aden Aluminium Representative in writing for resolution. In general, the most stringent requirement will prevail.

### This will include, but is not necessarily limited to:

- 2.1. All Sewage Lift Stations & Wastewater Treatment Plant (NEWT), Submersible pumps, Structural wet and dry well, Drains, Manholes, Ladders, Railings, Valves, Stuffing box and Industrial Piping's (underground, overheads, elevated Pipe lines, etc.) Metal Flat forms, Racks, Trays, Trenches, Culvert, Access Facilities, & Drainage System (Culvert, etc.) **General Repairs and Maintenance Services.**
  - 2.1.1 A list of all Sanitary Sewage Lift Station and Industrial Piping's (**Underground, OverheadS, Elevated, etc..**), Metals (Flat forms, Racks, Trays, Trenches, Access Facilities, etc..) covered under this Scope of Works are listed in **ANNEXURE 1A & 1B** as summarized below table.
  - 2.1.2 Ma'aden Aluminum reserves the right to amend, update the list of Sanitary Sewage Lift Station and Industrial Piping's (Underground, OverheadS, Elevated, etc..), Metals (Flat forms, Racks, Trays, Trenches, Access Facilities, etc..) & Drainage System (Culvert, etc.) lists from time to time to include upgraded, modified

and newly installed Lift Station, Sump pit and Industrial Piping's, Pipe lines, Metal Flat forms, Racks, Trays, Trenches, Access Facilities & Drainage System (Culvert, etc.) from Ma'aden Aluminum Complex onwards.

- 2.1.3 Furthermore, Ma'aden Aluminum reserves the full right to amend, add additional scope to suit its increasing services in quantities, quality and methodology during the contract life cycle. Subsequently, Ma'aden Aluminum constraints with a max 10% of the contract value.

## 2.2 Detailed Scope of Work:

- Ensure that the Contractor Service provider can supply personnel who are fully knowledgeable, technically qualified to perform the scope of maintenance repairs services for all Utility Process/Non process Facilities within Ma'aden Aluminum complex in safe and professional manner.
- The Contractor shall provide all labor, supervision, equipment, machinery tools and test equipment, vehicles, materials, spares, consumables, supplies and whatever other items considered necessary for satisfactorily performing of all services for the entire Utility Process and Non Process Facilities unless otherwise stated as being furnished by Ma'aden Aluminum.
- The Contractor shall provide a qualified maintenance workforce that are technically capable in repair, service and maintenance for all types of Sewage Lift Station Submersible Pumps, Valves, Motor and Electrical Works, Limit Switches & all necessary auxiliary equipment and Industrial Piping's (Underground, Overheads, Elevated, etc..), Metals (Flat forms, Racks, Trays, Trenches, Culvert, Access Facilities, etc..) used in Ma'aden Aluminum.
- Contractor services shall include Periodic Maintenance (PM) for Sewer Lift Station, Predictive (PdM), Coordinating Cleaning for Sump pit & force main from the sewage lift station as and when applicable, Pre-Inspection, Leaks & Fault Detection, Location of faulty Pipelines, repairs, overhauling, Lubrication for submersible pumps, replacement of defective parts and associated accessories (Motor Rewinding, Valves, flow meters, transducers Limit switches and other Instrumentations) to keep and maintain the equipment efficiency and reliability all times.

### ➤ Natural Engineered Wastewater Treatment Plant (NEWT) and Drainage System:

- 2.2.1. Maintenance Services at Dump Stations on as needed basis, repair damage or leaks at sump or drain, replace piping and/ or camlock fittings and remove source of clogging at sump & drain and pressure washing of dump station piping to Dump Station Tank.
- 2.2.2. Maintenance of Dump Station Tank and Pumping Station Major Overhaul of each pump to secure a long operating lifetime for the product including replacement of key components and the measures taken during and inspection.

- 2.2.3. Perform pump motor and impeller inspection (removal of pumps are required for inspection which requires a portable truck mounted hoist and access to the pumps through the roof mounted access hatches).
- 2.2.4. At Tanks remove floating debris, repair damage/ leaks and remove sources of clogging and address other miscellaneous tasks (replace pump impeller; replace pump corroded fasteners; clean all pump parts thoroughly, particularly O-ring grooves; change all pump gaskets and seal washers; lubricate all pump springs).
- 2.2.5. Maintenance associated with the Anaerobic Baffled Reactor (ABR) PSAT tanks (TK-102 and TK-103) on as needed basis, remove floating debris, repair damage/leaks, remove accumulated sludge, and adjust weir elevation and pressure wash cleaning of weirs troughs.
- 2.2.6. Maintenance on the oil/ water separator pump (P-104) as follows: activation; repair, removal of clogs, shoe clearance adjustment; gasket/ shaft seal replacement, perform system flush on oil/ water separator skimmer and repair/clean of coalester & screen.
- 2.2.7. Repair of HDPE Piping & Fittings, Carbon Steel Piping, Polyvinyl Chloride (PVC) Piping and Stainless piping as needed.
- 2.2.8. Maintenance, Repair and Replacement of all installed Valves and Piping/Fittings as needed.
- 2.2.9. Maintenance Repair/Overhaul and Replacement of all installed submersible pumps as needed.
- 2.2.10. Maintenance associated with all NEWT system such as Influent/Effluent Hydraulic Structures, CTW's, Blowers & Aeration System, Heat Exchangers, Diffusers, Organic Carbon Injection System, Brite Cell Disinfection System, Treated Water Holding Tank and Water Reuse Pumping System, UV Disinfection Tank, Infiltration Basin System, Off-gas treatment units, Activated Alumina System (AAST), Weir Plates & Trough, Flow Indicating Transmitters/Controllers, Sanitary Wastewater all Flow Sensors, Level Indicating Transmitters/Controllers/Switches, Pressure Transducers and Force Main etc.
- 2.2.11. Repair of MA Utility Drainage System includes Pumps, Control, Culvert Drainage, Valves etc. and Cleaning.

➤ **Sewage Lift Stations:**

- 2.2.12. Maintenance Services of lift station shall be in accordance with EN 12056 regulations. It is recommended that the lifting station is inspected monthly and its function checked. The lift station should be maintained by a qualified person at the following interval.
- 2.2.13. Lubricant Changing (Change Coolant) - The seal chamber between the motor and the hydraulic has been filled with oil as per OEM Manual recommendation.

Type of service	Purpose	Inspection interval
Initial Inspection	To make a checkup of the pump condition by an authorized service representative and, based on the result and findings from these measures, to determine the intervals for periodical inspection and major overhaul for the specific installation.	Yearly
Periodical Inspection	To prevent operational interruptions and machine breakdown. Measures to secure performance and pump efficiency are defined and decided for each individual application. It can include such things as impeller trimming; wear part control and replacement, control of zinc-anodes and control of the stator.	Quarterly
Major overhaul	To secure a long operating lifetime for the product. It includes replacement of key components and the measures taken during an inspection.	On Request

- 2.2.14. **Inspection:** Cable, Connection to power, Electrical cabinets, Impeller, Inspection chamber, Junction box, Level regulators, Lifting device, Lifting handle, O-rings, Overload protection and other Protections, Personnel safety devices, Rotation direction, Seal housing, Terminal board and Thermal contact, Thermistor, Voltage & Amperage etc.
- 2.2.15. **Major Overhaul:** For a major overhaul, take this action in addition to the tasks listed under inspection. Support and main bearing, mechanical seal, motor burn etc.
- 2.2.16. **Cleaning:** If the pump is used for transportable applications then it should be cleaned after each usage by pumping clear water in order to avoid deposits of dirt and encrustation. In the case of fixed installation, we recommend that the functioning of the automatic level control system be checked regularly. By switching the selection switch (switch setting "HAND") the sump will be emptied. If deposits of dirt are visible on the floats these should be cleaned. After cleaning, the pump should be rinsed out with water and a number of automatic pumping cycles carried out.
- 2.2.17. **Service in case of Alarm:** Thermal Contact, overload protection, CLS & FLS
- 2.2.18. **Service in case of Alarm:** Thermal Contact.
- 2.2.19. **Cleaning Sump Pit:** Debris in the sump pit is a major cause of float problems. Even if your pump is working as it should, cleaning out the pit should be a regular part of sump pump repair and maintenance. Remove any loose items in the pit. In addition Contractor shall be responsible for pulling pumps when needed.
- 2.2.20. **Lift station Repair and Maintenance:** Such as repairing/replacing damaged pipes, waterproofing of leaking structural dry & wet well and painting, repairing/replacing submersible motor & pumps, sensors, limit switches, etc.

➤ **PIPELINE MAINTENANCE REPAIR and ROUTE SETTING OUT SURVEY:**

Contractor shall carry out repairs of all types of piping listed in ANNEXURE 1A but not necessary limited to, for any damage/failure i.e. cracks, pinholes, joint leaks and associated pipe cutting/jointing, spool fabrication work, welding, pipe placement, hydro-testing and coating etc... Services thus include supply of tools and equipment, qualified engineer and skilled labor, supervision, consumables, non-consumable piping materials (unless supplied by Ma'aden Aluminum). Pre fabrication works may have to be carried out either on-site or off site. Most of the repairs under this contract shall be Call-out nature and includes planned repair services and routine surveys on request by Client.

**Note:** All Excavation, Trenching, Dewatering, Bedding, Backfilling, Compaction, Cement Stabilized Sand (or CLSM) and Concrete Encasement, etc... are included in the contracts services.

**A. Materials:**

**Consumable:**

Contractor shall maintain sufficient stock of all consumable materials necessary for the performance of the repair works and if not available in stock, shall procure and supply consumable materials includes but not limited to all types of material for Process and Utility Piping's.

**Non- Consumable:**

Contractor shall provide all the non-consumable piping materials necessary for repair work unless Ma'aden Aluminum provides them. Maaden Aluminum does not have any such stock at the time of making the scope or contract nor intending to hold stock in near future. But Ma'aden Aluminum reserves the right to supply such non consumable piping materials if it feels necessary because of any reasons during the period of the Contract.

**B. Tools & Equipment:**

Contractor shall supply all equipment and tools that are necessary to perform the services. Contractor's equipment/tools shall be provided with the necessary safety features. Any lifting device e.g. chain blocks/hoists that are to be used in implementing Services must be tested and certified by third party as fit to such use. Contractor shall inspect and ensure the working condition of equipment/tools and its fit for the purpose before utilizing the same. Ma'aden Aluminum shall neither be held responsible nor liable for the cost, or claims of whatsoever nature due to any delay or standby of Contractor, based on the condition of Ma'aden Aluminum supplied equipment/tools and its use by contractor.

Contractor shall supply equipment's such as Crane, Forklift and Erected Scaffolding as per requirements.

**C. Utilities:**

Service water, plant service air and electricity will be provided by Ma'aden Aluminum free of cost, at the nearest available distribution point in the Plant from where Contractor shall arrange for tapping to his point of use. Additional temporary lighting required shall

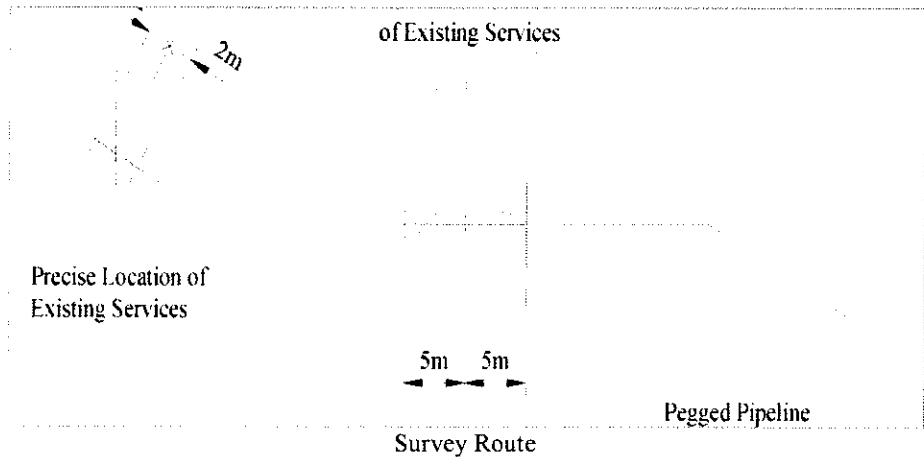


be arranged by Contractor, Ma'aden Aluminum will also support if the facilities are available during the job execution.

Temporary Power outlet from welding outlets at sites can be utilized, However incase if Ma'aden Aluminum unable to provide Contractor to arrange the same with no additional cost.

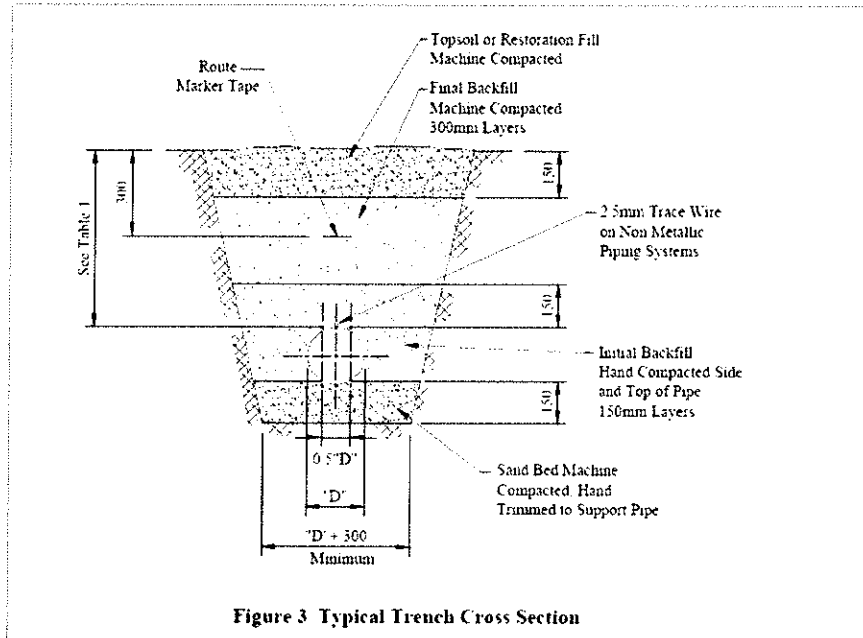
**2.2.21. Underground Piping's:**

- A. Prior to any excavation work, a licensed surveyor shall locate and peg out the pipeline route based on the pipeline alignment sheets. The existence of services, structures and any other obstructions on route shall be checked, identified and recorded.
- B. Where the pipeline route crosses existing services, the surveyor shall clearly mark on the ground the areas that shall be hand dug. The extent of hand excavation shall be:
  - a. Two (2) meters either side of existing services where the precise location is known.
  - b. Five (5) meters either side of an estimated service location, refer to Figure 2 below



**Figure 1: Extent of Hand Excavation in Vicinity of Existing Services**

- A. The recorded survey shall be updated after installation to reflect as built configuration and to record the precise location of existing services that are crossed.



**Figure 3 Typical Trench Cross Section**

PIPELINE CONTENTS	MINIMUM DEPTH (mm)		
	NORMAL EXCAVATION	UNDER A ROAD	UNDER A RAILWAY
Non-Hazardous Category D ASME B31.3	600	Within CSBP-600 Outside CSBP-1200	1200
Other than HVPL or Category D ASME B31.3	900	1200	2000
High Vapour Pressure Liquid (HVPL) eg: LP Gas	1200	1200	2000

**Table 1 Minimum Depth of Cover for Pipeline**

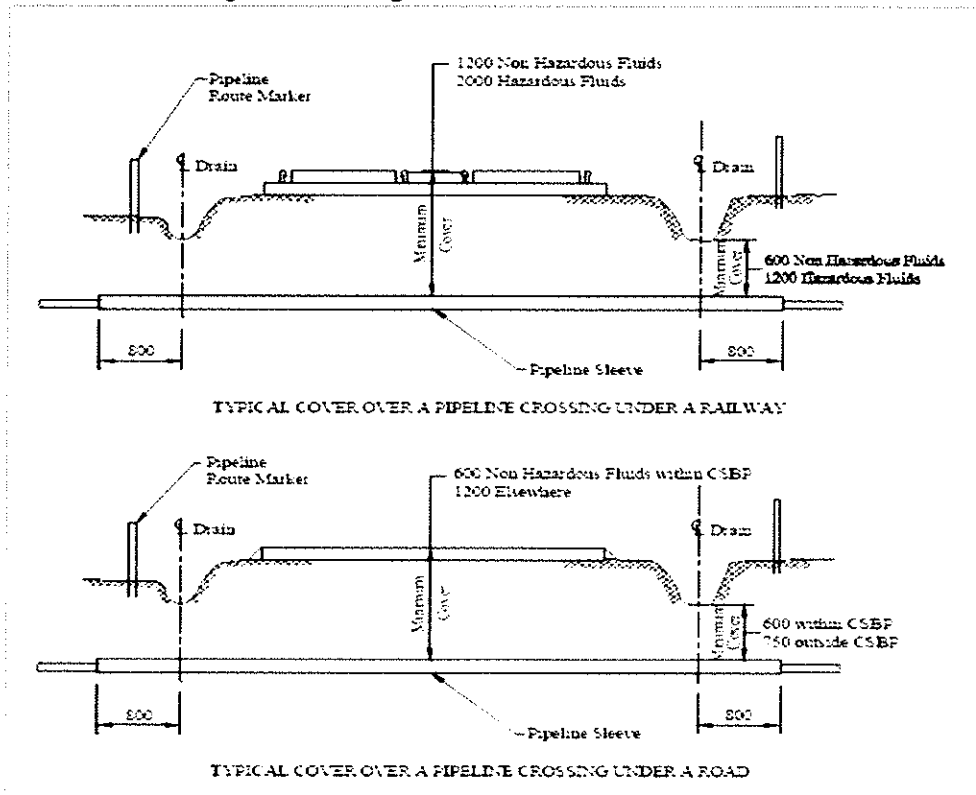
*Note:* Refer to Figure 4 and Figure 5 for coverage details with pipeline crossing a road or railway. Refer to Figure 6 for existing pipeline services crossover.

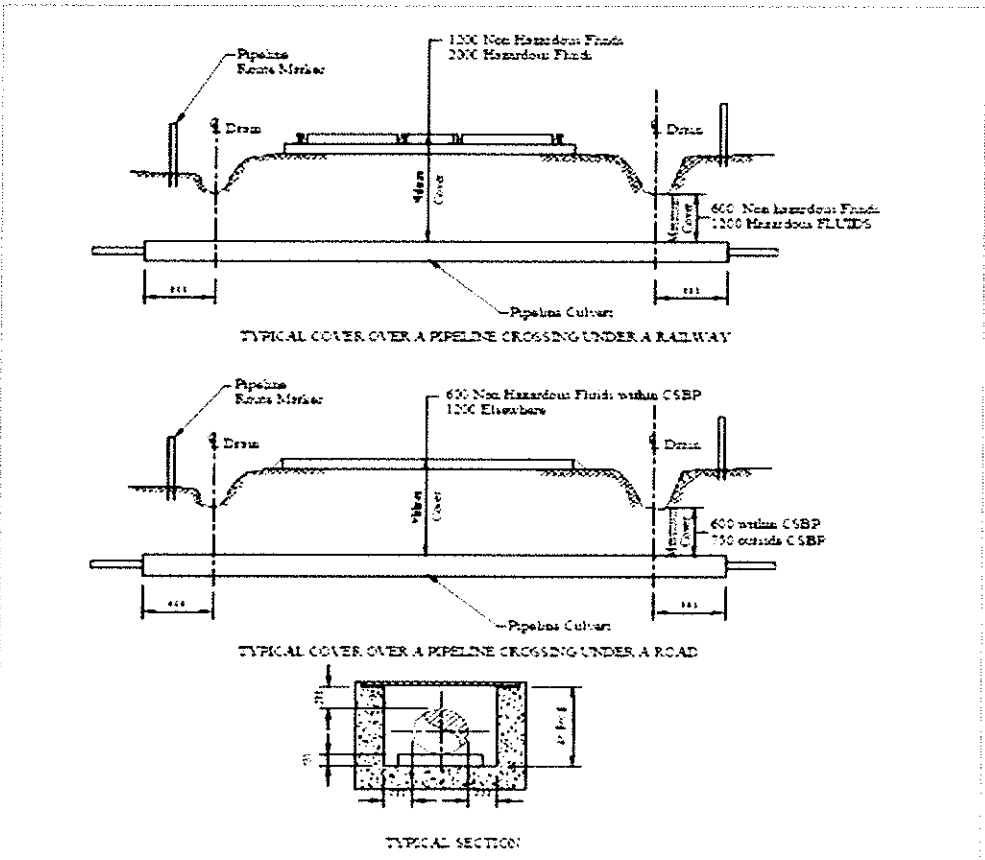
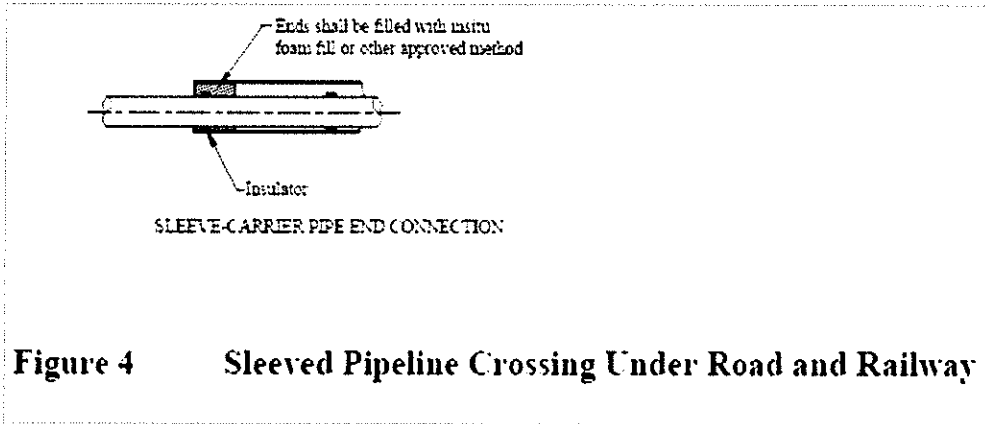
**2.2.23. Crossings:**

**Road and Rail Crossings**

- A. All road and rail crossings shall normally be crossed by boring and sleeping methods. Sleeves shall be made from steel pipe, either hot dipped galvanized or coated as per Section 5.0, except where the pipeline passing through the sleeve is cathodically protected in which case the sleeve shall be hot dipped galvanized
- B. The sleeve shall be a minimum 250mm nominal bore to allow for future installation of other 'small' lines without the need to dig up or bore under the road

- or rail line again. If the road or rail reserve has to be dug up to install a pipe then at least one spare pipe sleeve shall be installed, if there are no existing spare sleeves.
- C. Sleeved pipes, covering slabs, box culverts and tunnels shall be used where excessive loading conditions dictate, and as required by the specifics of the design.
  - D. The minimum depth of cover when crossing a road or railways shall be as specified in Table 1. Where a steel pipe passes through a sleeve, insulators or other Ma'aden Aluminum Representative approved method shall be used to prevent scuffing or damage to pipe coating during installation.
  - E. Installation procedures and equipment details shall be submitted by the Contractor to the Ma'aden Aluminum Representative for review and approval prior to commencement.
  - F. Where required due to the specifics of the design, a venting system shall be installed in the sleeve. Each end of sleeved section shall be sealed to prevent entrance of ground moisture and backfill material.
  - G. Refer to Figure 4 and Figure 5 for further details.





**Figure 5      Culvert Type Road and Railway Crossing**

**2.3. MAINTENANCE SERVICE UNIT RATES:**

- 2.3.1. The Contractor should define and submits the following rates subject to Ma'aden Aluminum Approval whichever is or applicable for this services.
- 2.3.2. Table of **Service Unit Rates (SUR)**
- 2.3.3. **Emergency On-Call Service Unit Rates**
- 2.3.4. Itemized Time Unit Rates (TUR) foe each Personnel Man-hours rates for the monthly timesheets submission and equipment rates to be utilized in performing General Maintenance Services such as will include but it is not necessary limited to, ANNEXURE I Pricing Format.
- 2.3.5. The Contractor personnel will be fully responsible for the Day-to-Day Maintenance and repairs of all the Sanitary Sewage Lift Station and Industrial Piping's (Underground, OverheadS, Elevated, etc..), Metals (Flat forms, Racks, Trays, Trenches, Culvert, Access Facilities, etc..) lists from time to time to include upgraded, modified and newly installed Lift Station, Sump pit, Industrial Piping's, Pipe lines, Metal Flat forms, Racks, Trays, Trenches, Access Facilities, etc..as listed in ANNEXURE II-1A & 1B for 24-hrs per day, 365 days a year.
- 2.3.6. **Job Execution:**
  - B. The contract service provider shall provide all trained qualified and trained manpower, resources and tools required to carry out all maintenance repair across Ma'aden Aluminum Operations.
  - C. The Contractor shall ensure sufficient site based personnel are trained and competent in the use of Elevated Work Platforms (EWP) and scissor lift devices to avoid any delay or disruption during job progress. Rope access inspection capability would also be well regarded.
  - D. **Job Performed under this Contract shall be three Categories:**
    - 1. **Emergency Repair Services:**
      - a. **Offline Repair** Any failure in the pipe which is deemed necessary to be repaired within 12 to 16 hours from the failure and keeping a unit or system isolated shall be under this category.
      - b. **Online Repair** Any leakages or fail of the system which cannot keep the system isolated shall be repaired online with technologies such as Mechanical Coupling & Sealing locks etc. Contractor to assess the leak or failure of piping and provide the clear recommendation for approval to Ma'aden Aluminum prior to repair this kind of services.

## **2. Planned Repair Services:**

Any repair or Improvement which is planned by considering the system considering the system condition from design, integrity or any other point, shall be considered as planned repair. The system will be offline or online shall be decided based on the isolation points and unit requirements.

## **3. Routine Surveys Services:**

Contractor to perform routine surveys by the qualified personnel (Engineer/Supervisor) to review a unit or a system as per requirements of Ma'aden Aluminum.

- 2.3.7. Contractor personnel should attend to breakdowns troubleshoots and repair to ensure equipment's efficiency and reliability.
- 2.3.8. Contractor personnel should implement Periodic Preventive, Predictive, Corrective Maintenance Schedules and activities as per Oracle-eAM and / or as per Manufacturer's maintenance recommendations. Post Maintenance Activities Report will be regularly submitted by the contractor to Ma'aden Aluminum Planner to monitor compliance
- 2.3.9. Contractor should strictly observe and ensure on-time execution of Periodic Maintenance schedules as prepared Ma'aden Aluminum Planner. Any deviation to the periodic maintenance schedule and tasks must be first communicated to Ma'aden Aluminum Planner for review and approval prior to execution.
- 2.3.10. Contractor to observe and execute lists of daily job priorities as may be set by Ma'aden Aluminum Planner for Corrective jobs as prepared and listed by Ma'aden Aluminum Planner on a daily basis as scheduled from Oracle-eAM.
- 2.3.11. Following an analysis of safety and environmental work, a work permit is mandatory for each procedure issued by the coordinator or supervisor sector owner scale.
- 2.3.12. Contractor required maintaining their own store & spares inventory subject to Ma'aden Aluminum Management monthly review.

## **2.4. Replacement Parts:**

- 2.4.1. Spare Parts supplied by the contractor, will be on cost plus with 5% marked up, to be invoiced separately.
- 2.4.2. Ma'aden Aluminum will maintain and supply the spare parts and contractor has to submit a list of spare parts required in advance prior to its job execution.
- 2.4.3. All replacement parts must be chosen to ensure the accuracy of the scale according to current standards. The contractor, before replacing the parts, must send the list of required spare parts to Ma'aden Aluminum to check availability at Ma'aden Aluminum warehouse. The Contractor could also choose to buy a third party with prior consent and approval by Ma'aden Aluminum

- 2.4.4. The Contractor should submit a list of recommended critical spare parts list with recommended minimum and maximum stock level and submit the same to Ma'aden Aluminum to ensure stock availability at Ma'aden Aluminum warehouse.
- 2.4.5. Any spare parts replacement should be communicated and documented with prior approval to Ma'aden Aluminum representative prior to actual replacement of defective parts except during emergencies where replacement of parts warrants immediate remedial action based on operational requirements and priorities.

## **2.5. SAFETY**

- 2.5.1. The Contractor is responsible for compliance with applicable local legislation and regulations for Safety and Health of their employees, facilities for their employees including medical care facilities and emergency transportation at worksite, waste disposal, and other environmental rules and regulations
- 2.5.2. The Contractor is responsible for compliance with applicable local legislation and regulations for Safety and Health of their employees, facilities for their employees including medical care facilities and emergency transportation at worksite, waste disposal, and other environmental rules and regulations.
- 2.5.3. The Contractor Management is held accountable for any violation to MA-EHS policies, Work Practices and applicable government laws / regulations by their employees
- 2.5.4. **MANPOWER REQUIREMENT:**  
The Contractor shall have a prior approval from Ma'aden Aluminum-CE&M for their manpower requirement for this Contract. The Contractor must submit all Resumes' of their personnel for this Manpower requirement to Ma'aden Aluminum-CE&M for technical qualification review and prior approval before hiring. The Contractor shall also ensure that said Manpower maintains at least 40% Saudization or as mandated by the KSA Government
- 2.5.5. Ensuring adequate Safety training of Contractor personnel to undergo site safety induction, competency for carrying out calibration work
- 2.5.6. Maintain an adequate and approved safety record that tracks all incidents, including near misses
- 2.5.7. Taking due care that personnel are fit for work, e.g. no excessive overtime.
- 2.5.8. Ensure Contractor must observe all site safety rules, e.g. site speed limit, personnel protective equipment requirements, etc. at all times.
- 2.5.9. The Contractor shall adhere to Ma'aden Aluminum safety regulations and shall be equipped with all required Personnel Protective Equipment (PPE) for the job.
- 2.5.10. The contractor should be equipped with necessary communication facilities as required. Also, contractor's transport arrangement should be available to take care of any emergency and should not be depending on Ma'aden Aluminum transportation at site.

- 2.5.11. For all site jobs, contractor will be designating a responsible person who will be completely responsible for completion of the jobs, collecting and returning of the work permits, safety requirements and for conduct of contractor's people within the premises of Ma'aden Aluminum. He will be coordinating and taking necessary work instruction from the Ma'aden Aluminum user department on daily basis
- 2.5.12. The working area shall be kept cleaned of all unwanted materials daily.
- 2.5.13. All emergency jobs will be coordinated between the Contractor, the Ma'aden Aluminum supervisor or his representative. Scheduled jobs will be coordinated by Ma'aden Aluminum Planner.
- 2.5.14. Permit to work shall be obtained as per Ma'aden Aluminum requirement before starting the WORK AT SITE.

## **2.6. PERSONAL PROTECTIVE EQUIPMENT**

The Contractor shall provide appropriate Personal Protective Equipment like Cotton / Acid proof Coveralls, Safety Shoes, Safety Helmet, Safety Harness, Safety Goggles, Hand Gloves, Dust masks, ear plugs / ear muffs, etc. required for the job. Also, ample quantity of above PPE shall be kept at site for replacement.

## **2.7. TRANSPORT, ACCOMMODATION AND FOOD FOR CONTRACTOR EMPLOYEES:**

The Contractor shall arrange transport, accommodation and food for their employees during the contract period.

## **2.8. CONTRACTOR RESPONSIBILITY:**

- 2.8.1. For any peak requirements the contractor will be responsible to mobilize the required resources to complete the given job within the time frame given.
- 2.8.2. Contractor shall keep a certain minimum number of crew to cater for the emergency requirements during the week ends and silent hours to cover operations 24/7, 365 days a year. When requested orally any time round the clock by Ma'aden Aluminum
- 2.8.3. Contractor representative in cases of emergency, contractor should proceed with the performance of the work and shall respond to such a request within Two (2) hours maximum of being so notified. Written confirmation of the request for emergency work shall be given to the contractor promptly following the initial oral/verbal request.
- 2.8.4. Contractor shall establish a call out system to ensure rapid mobilization of additional workforce in case of emergency requirements. Contractor shall provide contact telephones / pagers for the persons for round the clock coverage.



- 2.8.5. In certain cases, contractor shall be asked to exclusively assign a certain number of crew with full coverage on some critical jobs as standby. In such cases the payment will be made on timesheet basis.
- 2.8.6. Contractor will be expected to proactively target operational efficiency improvements offering associated cost reduction opportunities.
- 2.8.7. Contractor shall follow the regular timing of Ma'aden Aluminum during the working days.
- 2.8.8. Contractor shall observe and achieve KPI (Key Performance Indicators) as set by Ma'aden Aluminum with a minimum backlog set by MA-CM.
- 2.8.9. Contractor shall designate at least Two(2) persons as Work Permit Receiver which will be trained and granted with the required Authorization by MA-CM. The Contractor shall duly obtain safe work permit in coordination with Ma'aden Aluminum Representative.

**2.9. MA'ADEN ALUMINUM RESPONSIBILITY:**

- 2.9.1. Ma'aden Aluminum Representative to that necessary work permit is issued to the contractor.
- 2.9.2. Provide utilities like water, power, air etc. to the contractor to perform the work.
- 2.9.3. Ensure access is provided to the contractor for data entry and analysis for routine surveys.
- 2.9.4. Ensure access to equipment or piping for the contractor to carry out to carry out testing.

**2.10. CALL OUT/RESPONSE:**

- 2.10.1. **Emergency Response:** When requested verbally, any time round the clock by Ma'aden Aluminum Representative in cases of emergency, contractor should proceed with the performance of the work and shall respond to such a request within two (2) hours maximum of being so notified. Written confirmation of the request shall be given to the contractor promptly following the initial verbal request
- 2.10.2. **Urgent Response:** When requested verbally, any time round the clock by Ma'aden Aluminum Representative in urgent cases, contractor should respond to such a request within six (6) hours of being so notified. Written confirmation of the request shall be given to the contractor promptly following the initial verbal request
- 2.10.3. **Normal Response:** Contractor should perform the work as per Ma'aden Aluminum required schedule.

**2.11. SERVICE REQUEST:**

- 2.11.1. Whenever required, the concerned Ma'aden Aluminum Representative will place a Service Request with the contractor by Telephone, fax or e-mail, at any time whatsoever. Telephone request shall be followed up with a fax request. The request shall clearly indicate the scope of services, the date and time service needed.
- 2.11.2. Contractor shall perform only such work as specifically requested or authorized. Any services furnished by Contractor, which has not been so requested or authorized by the concerned Ma'aden Aluminum Representative shall not qualify for payment.

**2.12. QUALITY ASSURANCE AND CONTROL:**

- 2.12.1. The prime responsibility for performing quality workmanship rests with the contractor. The contractor shall conduct a quality control program approved by Ma'aden Aluminum to measure, test and document the degree of conformance to the specifications. Ma'aden Aluminum shall monitor and validate the performance of the contractor's quality control effort. The contractor's responsibility shall apply to all phases of work.

**2.12.2. Manpower Qualification:**

Contractor shall pre-qualify from Ma'aden Aluminum authorized section; all repair personnel who will be carrying out repair works. After contract award, Contractor shall submit for Ma'aden Aluminum prior approval, a detailed pre-qualification procedure. Such qualification test shall be arranged and carried out by Contractor at his workshop/premises and all required piping material, consumable etc. will be supplied by him at his own cost. All records and certificates pertaining to the qualification/certification of manpower shall be submitted to Ma'aden Aluminum.

The intention of Ma'aden Aluminum for the above said pre-qualification requirements is to ensure that well qualified, experienced technicians are employed on the repair. As a substitute, if Contractor provides assurance about his existing technician by submission of documents like CV's, experience certificates, qualification trade test carried out by themselves as part of QA/QC procedures, those can be accepted by Ma'aden Aluminum at its own discretion. However, during Contract duration, if any new technician is employed, Company reserves the right to witness any pre-qualification test.

**2.12.3. Materials:**

After award of contract, before commencement of Services for each repair, the Contractor shall submit to Company the material schedule which will include for each material (pipes/fittings) and consumables (for all types of pipes repair consumables etc.) the manufacturer's/local agent details, product ref nos. to be used for rectification/modification of such repair. Contractor shall also certify the quality of all such materials and consumables supplied and used by him. The certification shall include production/expiry dates to the satisfaction of Ma'aden Aluminum. Consumables shall be recommended by the pipe manufacturers. All certificates shall be submitted to Ma'aden Aluminum.

**2.12.4. Hydrotest:**

Upon completion of the repair/modification work, Ma'aden Aluminum opts to decide on the type of test to be performed on the pipeline affected by the Services performed. Most tests will be service test, however and if instructed by Ma'aden Aluminum, Contractor may be requested to carry out a hydrostatic test on the affected pipeline; In such case, Contractor shall carry out all arrangements including any blinding, de-blinding, supply and fixing/removal of pressure gauges etc. for the hydro test. Contractor shall provide hoses, pressure gauges etc. for conducting the hydro test at its own cost; the pressure gauges shall be calibrated and certified and a copy of the certificate shall be submitted to the Ma'aden Aluminum prior to its use. In specific cases, where hydro test cannot be performed, then Ma'aden Aluminum will request Contractor to carry out service test in lieu of hydro test. Such decision to carry out Service test in lieu of hydro test is solely at the discretion of Ma'aden Aluminum.

**2.12.5. Acceptance:**

Upon the receipt of a satisfactory test result, for each repair, Company will sign on the Contractor's Standard Test Acceptance Form, verifying the conclusion of the repair/modification work and having witnessed, if applicable, the hydro test.

**2.12.6. Reject and Repair Rectification:**

Ma'aden Aluminum may reject all or any portion of work on the ground of inferior workmanship, materials or non-conformity with the requirements of the contract. The contractor shall correct the same without additional cost to the owner.

If any repair/modification work undertaken by Contractor fails within six (6) months of the Test Acceptance date, Contractor shall promptly remedy the same at his own expense the complete scope of Services.

**3. CONTRACT PERIOD:**

- 3.1.1. The contract duration is for **Three (3) Years** from the effective date of this contract unless terminated earlier upon 90 calendar days written notice or extended in working by mutual agreement of both the parties. Said contract is renewable for **Two(2) years** onwards subject to Ma'aden Aluminium' approval.

**Annex II: 1A- IIP's List of Ma'aden Aluminum's UTILITY PIPING'S:**

AREA	PIPING TYPES	Unit Rates	Remarks
NATURAL GAS PIPELINE	<ul style="list-style-type: none"> <li>CARBON STEEL – (A/G)</li> <li>CARBON STEEL C&amp;W – (U/G)</li> </ul>		
FIRE WATER PIPELINE	<ul style="list-style-type: none"> <li>PIPE STD WT SMLS STL A106-B</li> <li>PIPE BELL/SPIGOT FRP FIL WD EPOXY WFF 12.1 BARG UL/FM, 10 MM THK, 5 MM THK,</li> </ul>		
POTABLE WATER PIPELINE	<ul style="list-style-type: none"> <li>PIPE SCH 10S EFW 316/316L SS A312</li> <li>PIPE BELL/SPIGOT FRP FILW ED EPOXY WPR 14 BARG (15 MM THK, 17 MM THK, 10 MM THK, 9 MM THK.)</li> <li>PIPE PE FRP FIL WD EPOXY WPR 14 BARG A/G SERVICE</li> <li>PIPE PE FRP FIL WD VINLYESTER SWR 3 BARG U/G SERVICE</li> <li>Externally coated carbon steel (U/G)</li> </ul>		
PROCESS WATER PIPELINE	<ul style="list-style-type: none"> <li>GRP/FRP/GRE (glass reinforced)</li> <li>316 or 316L or 316/316L Dual Certified SS</li> <li>Plastic (excluding FRP)</li> <li>HD POLYETHYLENE (HDPE)</li> </ul>		
SEA WATER AND DESAL DEMI WATER PIPELINE	<ul style="list-style-type: none"> <li>GRP/FRP/GRE (glass reinforced)</li> </ul>		
IRRIGATION, SANITARY PIPELINE	<ul style="list-style-type: none"> <li>CARBON STEEL</li> <li>HD POLYETHYLENE (HDPE)</li> </ul>		
DIESEL FUEL and INSTRUMENT AIR PIPELINE	<ul style="list-style-type: none"> <li>CARBON STEEL</li> </ul>		
STORM WATER DRAINAGE	<ul style="list-style-type: none"> <li>PIPE AND REINFORCED CONCRETE</li> </ul>		

**Annex 1B- List of Ma'aden Aluminum's Lift Stations:  
 IIP and Smelter Area Lift Stations:**

Lift Station #	Location	Pump Motor No./ Asset Tag No.	Quantity (EA)	Motor		Unit Rates	Remarks
				Rating KW	Run. Ampere		
PS-1	Near Carbon Paste Plant	1210-MPGO-001	2	2.8	4.5 A		
		1210-MPGO-002		2.8	4.5 A		
PS-2	Inside Carbon Plant	1210-MPGO-003	2	3.5	1.8 A		
		1210-MPGO-004		3.5	1.8 A		
PS-3	Near Smelter Admin. Building	1210-MPGO-005	2	2	2.9		
		1210-MPGO-006		2	2.9		
PS-4	Near Ware House	1210-MPGO-007	2	12.5	18 A		
		1210-MPGO-008		12.5	18.5 A		
PS-5	Near Reduction Office	1210-MPGO-009	2	9	14 A		
		1210-MPGO-010		9	13.5 A		
PS-6	Near Cast House	1210-MPGO-011	2	4.5	5.5 A		
		1210-MPGO-012		4.5	6.0 A		
PS-7	Reduction GTC Line-D Central Passage	1210-MPGO-013	2	2	3.0 A		
		1210-MPGO-014		2	3.0 A		
PS-8	Reduction GTC Line-C	1210-MPGO-015	2	4.5	6.9 A		
		1210-MPGO-016		4.5	6.9 A		
PS-9	Reduction GTC Line-D93	1210-MPGO-017	2	4.5	6.7 A		
		1210-MPGO-018		4.5	6.7 A		
PS-10	Reduction GTC-2	1210-MPGO-019	2	20	4.8A		
		1210-MPGO-020		20	4.8 A		
PS-11	Near Rolling Mill	1210-MPGO-021	2	20			
		1210-MPGO-022		21			
PS-12	Reduction GTC-3	1210-MPGO-023	2	1.5	3.0 A		
		1210-MPGO-024		1.5	3.0 A		
PS-13	Reduction GTC-2	1210-MPGO-025	2	1.8	2.9 A		
		1210-MPGO-026		1.8	2.8 A		
PS-14	Near Process Water Tank	1210-MPGO-027	2	2.25	3.0 A		
		1210-MPGO-028		2.25	3.0 A		
LS-001	IIP Near Main Admin Mosque	4400-P-01A	3				
		4400-P-01B					
		4400-P-01C					
LS-002	IIP Near Visitor Building	4412-P-01A	2				
		4412-P-01B					
<b>TOTAL</b>			<b>33</b>				

PROJECT TITLE: UTILITIES SYSTEMS REPAIRS & MAINTENANCE SERVICES FOR MA'ADEN ALUMINUM CO., RAS AL-KHAIR (RFP# 16-611-AL-310)  
 LOCATION: RAS AL-KHAIR  
 CLIENT: MA'ADEN  
 BIDDER:  
 ANNEXURE I PROPOSED PRICING FORMAT

ITEM #	ITEM DESCRIPTION	UOM	QTY	UNIT RATES		REMARK
				CONSTN	MATERIAL	
1.0	MECHANICAL / PIPING & VALVES				HOT	
1.1	Install piping above-ground, underground, overheads, elevated complete including, but not limited to, preparing right of way, transporting materials, welding, crane for installation, installing in pipe rack, radiography, stress relieving, cleaning, painting, testing, pre-commissioning and clean-up. Pipe measured through all welded fittings excluding between flanges of valves. Price includes installation of valves.					
	<b>Pipe Size</b>					
1.1.1	Wall Thickness					
1.1.1	1/4" to 1-1/2"	LM	1			
1.1.2	.500" and less	LM	1			
1.1.3	2" to 4"	LM	1			
1.1.4	500" and less	LM	1			
1.1.4	6" to 8"	LM	1			
1.1.4	10" to 12"	LM	1			
1.1.5	.500" and less	LM	1			
1.1.5	14" to 16"	LM	1			
1.1.6	20" to 24"	LM	1			
1.1.7	.500" and less	LM	1			
1.1.7	30" to 36"	LM	1			
1.1.8	.625" and less	LM	1			
1.1.8	40" to 42"	LM	1			
1.1.9	.625" and less	LM	1			
1.1.10	.625" and less	LM	1			
1.1.10	46" to 48"	LM	1			
1.1.11	.625" and less	LM	1			
1.1.11	52" to 54"	LM	1			
1.1.11	.625" and less	LM	1			
1.1.11	56" to 60"	LM	1			
	<b>ITEM #</b>	<b>ITEM DESCRIPTION</b>	<b>UOM</b>	<b>QTY</b>	<b>UNIT RATES</b>	<b>REMARK</b>
					<b>CONSTN</b>	<b>MATERIAL</b>
						<b>TOTAL</b>
1.0	MECHANICAL / PIPING & VALVES					COLD
1.1	Install piping above-ground, underground, overheads, elevated complete including, but not limited to, preparing right of way, transporting materials, welding, crane for installation, installing in pipe rack, radiography, stress relieving, cleaning, painting, testing, pre-commissioning and clean-up. Pipe measured through all welded fittings excluding between flanges of valves. Price includes installation of valves.					
	<b>Pipe Size</b>					
1.1.1	Wall Thickness					
1.1.1	1/4" to 1-1/2"	LM	1			
1.1.2	.500" and less	LM	1			
1.1.3	2" to 4"	LM	1			
1.1.3	500" and less	LM	1			
1.1.4	.500" and less	LM	1			
1.1.4	6" to 8"	LM	1			
1.1.4	10" to 12"	LM	1			
1.1.5	.500" and less	LM	1			
1.1.5	14" to 16"	LM	1			
1.1.6	20" to 24"	LM	1			
1.1.6	.500" and less	LM	1			
1.1.7	.625" and less	LM	1			
1.1.7	30" to 36"	LM	1			
1.1.8	.625" and less	LM	1			
1.1.8	40" to 42"	LM	1			

PROJECT TITLE: UTILITIES SYSTEMS REPAIRS & MAINTENANCE SERVICES FOR MA'ADEN ALUMINUM CO., RAS AL-KHAIR ((RFP# 16-611-AL-310))  
 LOCATION: RAS AL-KHAIR  
 CLIENT: MA'ADEN  
 BIDDER:  
 ANNEXURE I PROPOSED PRICING FORMAT

ITEM #	ITEM DESCRIPTION	UOM	QTY	UNIT RATES			REMARK
				CONSN	MATERIAL	TOTAL	
1.1.9	46" to 48"	LM	1				
1.1.10	.625" and less	LM	1				
1.1.11	52" to 54"	LM	1				
	56" to 60"	LM	1				
2.13	Existing structure modification including scaffolding, crane for installation and temporary supports.						
2.13.1	Up to 20 kg per LM	LM	1				
2.13.2	21 kg to 40 kg per LM	LM	1				
2.13.3	41 to 132 kg per LM	LM	1				
2.14	Scaffolding (The rate includes installation and removal)						
2.14.1	Tower or Mobile Scaffold furnished with one working platform, up to 6M height	cm-day					
2.14.2	Tower or Mobile Scaffold furnished with one working platform, 6 -12M height	cm-day					
2.14.3	Tower or Mobile Scaffold furnished with one working platform, 12 -24M height	cm-day					
2.14.4	Tower or Mobile Scaffold furnished with one working platform, >24M height	cm-day					
2.14.5	Suspended / Cantilever Mobile Scaffold, up to 6M height	sm-day					
2.14.6	Suspended / Cantilever Mobile Scaffold, 6 -12M height	sm-day					
2.14.7	Suspended / Cantilever Mobile Scaffold, 12 - 24M height	sm-day					
2.14.8	Suspended / Cantilever Mobile Scaffold, >24M height	sm-day					
2.14.9	Additional Working Platform, up to 6M height	sm-day					
2.14.10	Additional Working Platform, 6 - 12M height	sm-day					
2.14.11	Additional Working Platform, 12 - 24M height	sm-day					
2.14.12	Additional Working Platform, >24M height	sm-day					
4.0	MANPOWER UNIT RATES						
4.1	Supervisor	HR					
4.2	Electrician	HR					
4.3	Insulator/Mason/Plasterer	HR					
4.4	Helper-Semi-skilled	HR					
4.5	Laborer	HR					
4.6	Millwright	HR					
4.7	Painter/Sandblaster	HR					
4.8	Pipe Fitter	HR					
4.9	Welder - Structural/Piping	HR					
4.10	Rebarman	HR					
4.11	Skilled Craftsman	HR					
4.12	Welder - Piping	HR					
4.13	Rigger -Level -1	HR					

PROJECT TITLE: UTILITIES SYSTEMS REPAIRS & MAINTENANCE SERVICES FOR MA'ADEN ALUMINUM CO., RAS AL-KHAIR ((RFP# 16-611-AL-310))

LOCATION: RAS AL-KHAIR  
 CLIENT: MA'ADEN

BIDDER:

ANNEXURE I PROPOSED PRICING FORMAT

ITEM #	ITEM DESCRIPTION	UOM	QTY	UNIT RATES		REMARK
				CONSTN	MATERIAL	
				TOTAL		
4.14	Rigger -Level -2	HR				
4.15	Rigger -Level -3	HR				
4.16	Surveyor (Including instruments)	HR				
4.17	Chainman	HR				
4.18	Foreman	HR				
4.19	Instrument Filter	HR				
4.20	Cable Splicer	HR				
4.21	Scaffolder	HR				
4.22	Project Manager	HR				
4.23	Construction Superintendent	HR				
4.24	Project Planner	HR				
4.25	Equipment Engineer	HR				
4.26	Pre-commissioning Engineer	HR				
4.27	Piping Inspector	HR				
4.28	Civil /Struct. Inspector	HR				
4.29	Electrical/Instrumentation Inspector	HR				
4.30	Laminator	HR				
5.0	EQUIPMENT RATES					
5.1	Light Trucks - Pickup Trucks					
5.1.1	1/2 ton, 4 x 2	HR				
5.1.2	3/4 ton, 4 x 2	HR				
5.1.3	1 ton, 4 x 2	HR				
5.1.4	Stakebed 1 ton	HR				
5.2	Heavy Duty Trucks					
5.2.1	Flatbed 14 FT. 2-Ton	HR				
5.2.2	Dump Truck 10 C.Y.	HR				
5.2.3	Dump Truck 17C.Y.	HR				
5.2.4	Water Truck with pump - 2000 gallon	HR				
5.2.5	Water Truck with pump - 6000 gallon	HR				
5.2.6	Truck Tractor, 4 x 2	HR				
5.2.7	Truck Tractor, 6 x 4	HR				
5.2.8	Crude Oil Tanker - 6000 Gal	HR				
5.2.9	Boom Truck 18 Feet with 3 - Ton boom	HR				
5.3	Hauling Trailers					
5.3.1	Platform - Semi 35 ft - 30 ton	HR				
5.3.2	Low Bed - Semi 2 x 6 - 40 ft	HR				
5.3.3	Pipe Trailer	HR				



PROJECT TITLE: UTILITIES SYSTEMS REPAIRS & MAINTENANCE SERVICES FOR MA'ADEN ALUMINUM CO., RAS AL-KHAIR (RFP# 16-6/1-AL-3/0)  
 LOCATION: RAS AL-KHAIR  
 CLIENT: MA'ADEN  
 BIDDER:  
 ANNEXURE I PROPOSED PRICING FORMAT

ITEM #	ITEM DESCRIPTION	UOM	QTY	UNIT RATES		REMARK
				CONSTR	MATERIAL	
				TOTAL		
<b>5.4</b>	<b>Compactors and Vibrators</b>					
5.4.1	Diesel 6 H.P. 30 x 36 Plate	HR				
5.4.2	Self-propelled 2500 LB Vibrator	HR				
5.4.3	Self-propelled 4200 LB Vibrator	HR				
<b>5.5</b>	<b>Excavators</b>					
5.5.1	Front End Loader – 2 ½ C.Y.	HR				
5.5.2	Front End Loader – with Backhoe ¾ C.Y.	HR				
5.5.3	Backhoe – Crawler – ¾ C.Y.	HR				
5.5.4	Backhoe with Hydraulic Rock Breaker	HR				
5.5.5	Motor Grader	HR				
<b>5.6</b>	<b>Dozers</b>					
5.6.1	Diesel – D6	HR				
5.6.2	Diesel – D8	HR				
<b>5.7</b>	<b>Fork Lift</b>					
5.7.1	530 Cat	HR				
5.7.2	966 Cat	HR				
5.7.3	980 Cat	HR				
<b>5.8</b>	<b>Cranes</b>					
5.8.1	18 Ton Standard Boom	HR				
5.8.2	40 Ton Long Boom	HR				
5.8.3	80 Ton Long Boom	HR				
5.8.4	120 Ton Long Boom	HR				
<b>5.9</b>	<b>Pipe Equipment Misc.</b>					
5.9.1	Internal Clamp – 20" – 36"	HR				
5.9.2	Cut Bevel Machine – 6" – 20"	HR				
5.9.3	Cut Bevel Machine – 22" – 32"	HR				
5.9.4	Cut Bevel Machine – 34" – 60"	HR				
5.9.5	External Clamp – 2" – 14"	HR				
5.9.6	External Clamp – 16" – 36"	HR				
5.9.7	External Clamp – 40" – 60"	HR				
<b>5.10</b>	<b>Concrete Handling Equipment</b>					
5.10.1	6 C.F. Concrete Mixer	HR				
5.10.2	10 C.F. Concrete Mixer	HR				
5.10.3	1 C.Y. Bucket – Bottom Dump	HR				
5.10.4	Concrete Vibrator	HR				
5.10.5	Rebar bending machine	HR				
5.10.6	Jackhammer	HR				

PROJECT TITLE: UTILITIES SYSTEMS REPAIRS & MAINTENANCE SERVICES FOR MA'ADEN ALUMINUM CO., RAS AL-KHAIR (RFP# 16-611-AL-310)  
 LOCATION: RAS AL-KHAIR  
 CLIENT: MA'ADEN  
 BIDDER:  
 ANNEXURE I PROPOSED PRICING FORMAT

ITEM #	ITEM DESCRIPTION	UOM	QTY	UNIT RATES		REMARK
				CONSTN	MATERIAL	
			TOTAL			
<b>5.11</b>	<b>2.11. Welding Machines</b>					
5.11.1	Motor Gen – 300 Amp. D.C.	HR				
5.11.2	Motor Gen – 400 Amp. D.C.	HR				
5.11.3	Oxy – Acetylene Set w/ Torch	HR				
<b>5.12</b>	<b>2.12. Pumps</b>					
5.12.1	Chemical Injection Pump	HR				
5.12.2	Hydrotest Pump	HR				
5.12.3	Fill Pump	HR				
5.12.4	4" Dewatering Pump	HR				
5.12.5	8" Dewatering Pump	HR				
<b>5.13</b>	<b>Air Compressors</b>					
5.13.1	150 CFM – Portable w/Rec. Gas	HR				
5.13.2	175 CFM – Portable w/Rec. Diesel	HR				
5.13.3	375 CFM - Portable w/Rec. Gas	HR				
5.13.4	600 CFM - Portable w/Rec. Diesel	HR				
<b>5.14</b>	<b>Spray Paint Equipment</b>					
5.14.1	Sand Blast Machine – 150 LB	HR				
5.14.2	Sand Blast Machine – 600 LB	HR				
5.14.3	Painting Sets (Pots, Hoses, Heads, etc.)	HR				
<b>5.15</b>	<b>Light Plant and Towers</b>					
5.15.1	Light Plant 7.5 KW	HR				
5.15.2	Light Plant 10 KW	HR				
5.15.3	Generator Set – 5 KW	HR				
5.15.4	Generator Set – 10 KW	HR				
5.15.5	Generator Set – 11 to 20 KW	HR				
5.15.6	Generator Set – 100 KW	HR				
5.15.7	Generator Set – 200 KW	HR				
<b>5.16</b>	<b>Saws</b>					
5.16.1	Wach Saw	HR				
5.16.2	Guillotine Saw	HR				
<b>5.17</b>	<b>Miscellaneous</b>					
5.17.1	Radiography Equipment for up to 60" pipe	HR				
5.17.2	Hydrotest Pressure recorder with charts	HR				